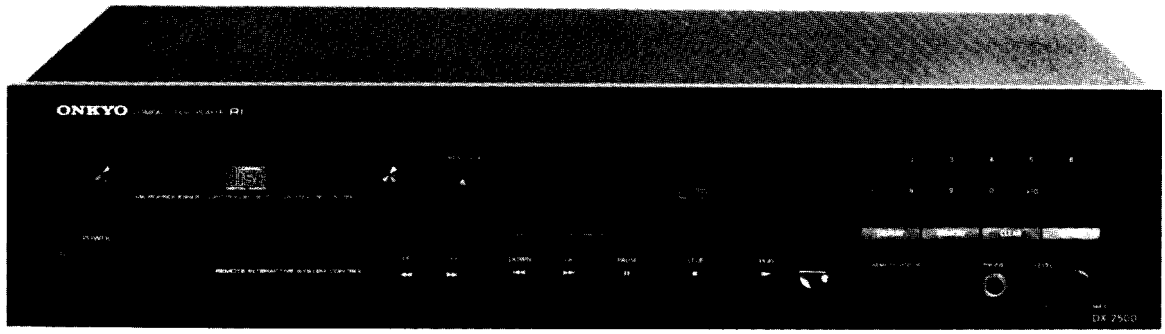
SERIAL NO.3287

ONKYO® SERVICE MANUAL

COMPACT DISC PLAYER
MODEL DX-2500



Black model

BUDN, BUD	120V AC, 60 Hz
BUG	220V AC, 50Hz
BUU	110/120/220/240V AC, 50/60Hz
BUQA, BUQB	240V AC, 50 Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

SPECIFICATIONS

Signal readout system:	Optical non-contact
Reading rotation:	About 500~200 r.p.m. (constant linear velocity)
Linear velocity:	1.2~1.4m/s
Error correction system:	Cross interleave readsolomon code
Decoded bits:	16 bits linear
Sampling frequency:	88.2kHz (two-times oversampling)
Number of channels:	2 (stereo)
Frequency response:	2Hz~20kHz
Total harmonic distortion:	0.004% (at 1kHz)
Dynamic range:	93dB
Signal to noise ratio:	96dB
Channel separation:	90dB (at 1kHz)
Wow and Flutter:	Below threshold of measurability
Power comsumption:	16 watts
Output level:	2 volts r.m.s.
Dimensions (W x H x D):	435 x 98 x 361mm 17-1/8" x 3-7/8" x 14-1/4"
Weight:	4.8kg, 10.6 lbs

Specifications are subject to change without notice.

ONKYO
AUDIO COMPONENTS

SERVICE PROCEDURES

1. Regarding the lock for transport protection

For the protection of the laser and optical parts during transport, a lock is provided on the bottom surface of the machine. When using the machine, turn the transport lock lever 180° counterclockwise to release the optical pickup. If the lock is not turned completely, the section at the beginning of the recording will be interrupted. When this symptom occurs, check the position of the lock lever.

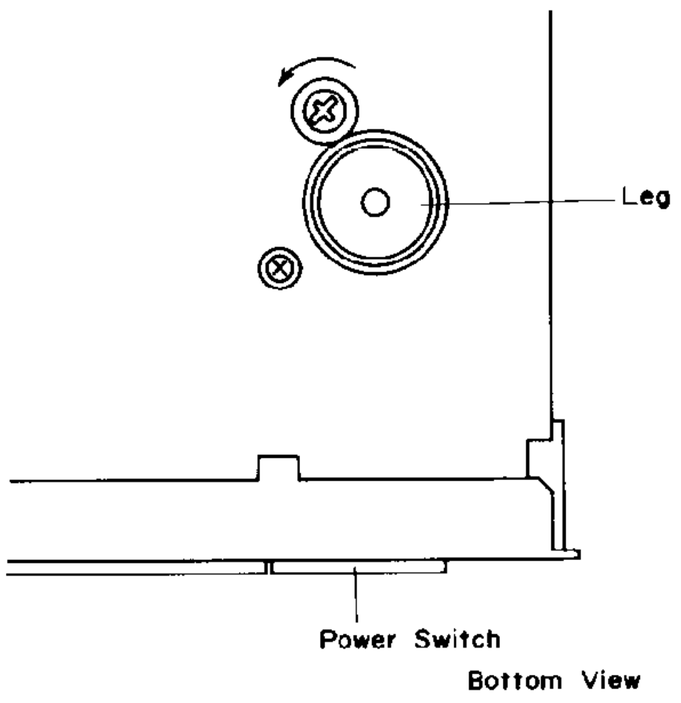


Fig. 1

2. Procedures for replacement of flat packaged ICs

1. Tools to be used:

(1) **Soldering iron** . . . . Grounded soldering iron or soldering iron with leak resistance of 10 Mohms or more.

Form of soldering iron's tip:

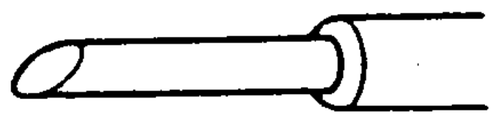


Fig. 2

(2) **Magnifying glass** . . . for checking of finished works

(3) **Tweezers** . . . . . for handling of IC and forming of leads

(4) **Grounding ring** . . . . Countermeasure for electrostatic breakdown

(5) **Nipper** . . . . . for removing defective IC

(6) **Small brush** . . . . . for application of flux

(7) Enamel line

2. Work Procedures:

(1) Remove the defective IC

Cut all leads of the defective IC one by one using a nipper and remove the IC.

1. An enamel line has been pierced between the legs of the flat package IC.
2. Use a soldering iron to unsolder the legs one at a time.
3. Repeat the procedure of 1 and 2 above for the 3 sides only.

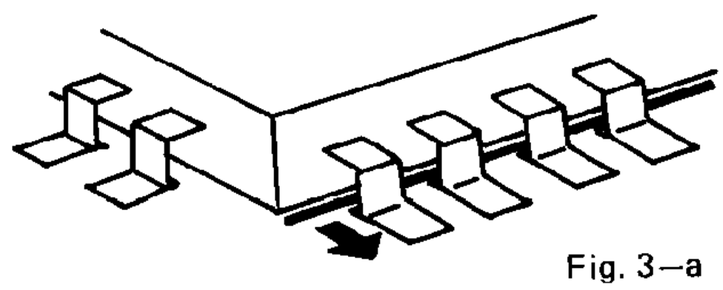


Fig. 3—a

While holding the soldering against the enamel line, pull in the direction of the arrow.

(2) Clean the pattern surface of the PC board.

Get rid of the remaining leads and solder.

(3) Check and from the leads of the new flat packaged IC to be installed.

From every lead on the new IC using a pair of tweezers, so that all of them are aligned neatly without being risen, twisted or inclined toward one side. Especially the rising portion of every lead must be formed with greatest care.

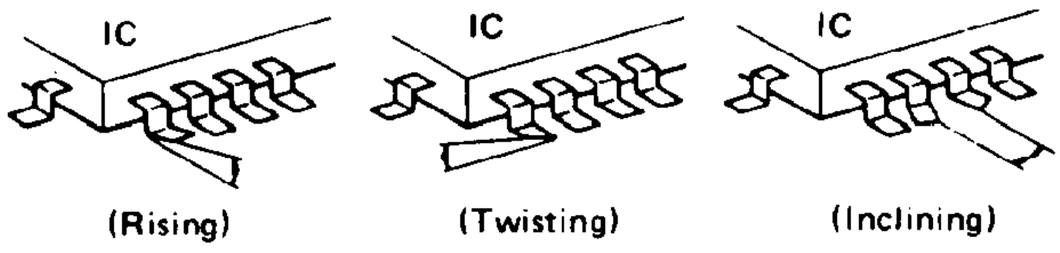


Fig. 3—b

(4) Apply flux to the PC board.

Apply flux to the pattern surface of the PC board which has been cleaned, as shown in the illustration. The area to be applied with flux is the portion of about 2.5mm in width where the IC's leads are to be soldered.

Be careful to apply minimum amount of flux required so as not to smear it on unwanted areas.

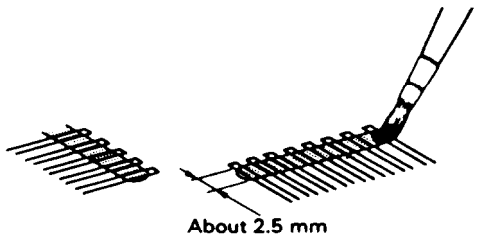


Fig. 4

(5) Temporarily tighten the IC

Carefully align the pattern and IC's leads, so that the IC will be temporarily tightened to the pattern on the four leads at the corners. At this time, soldering is required, but no need to apply soldering material.

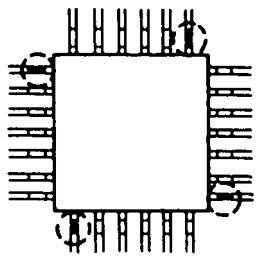


Fig. 5

(6) Apply flux to IC's leads

Apply flux to the areas of IC's leads where soldering is to be performed. Be careful not to smear flux on the root portion of any lead or the body of IC.

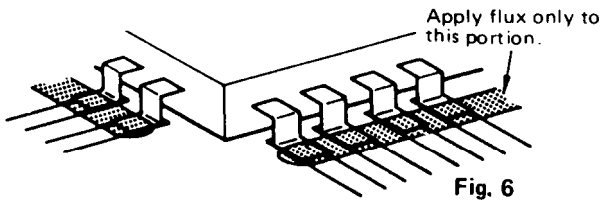


Fig. 6

(7) Soldering

While attaching the tip of the soldering iron to the soldering point as shown in the illustration, feed 2 –5mm of soldering wire. Then, slowly move the iron in the direction indicated by the arrow in the illustration, so that the leads will be soldered to the pattern. Move the iron in the rate of approximately 1cm in 5sec. Proceed with your work while confirming a clean fillet of solder is formed on each lead, subsequent to the melting of flux.

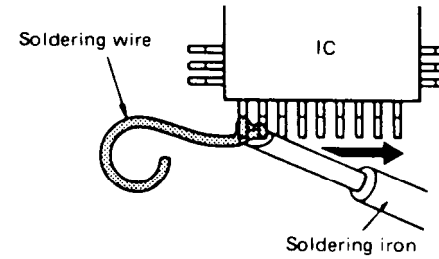


Fig. 7

CAUTION

1) If you move the iron too quickly, loose soldering is likely to result.
2) Be especially careful when soldering the first lead where loose soldering is most liable to be formed.

(8) Check the results

When soldering of all leads is finished, check the soldered portion on every lead with a magnifying glass. A tester must not be used or checking of any soldered position

3. Safety-check out (U.S.A. model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Connect the insulating-resistance tester between the plug of power supply cable and chassis.

Specifications: more than 10Mohm at 500V.

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

WARNING!!

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMMISION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

Laser Diode Properties

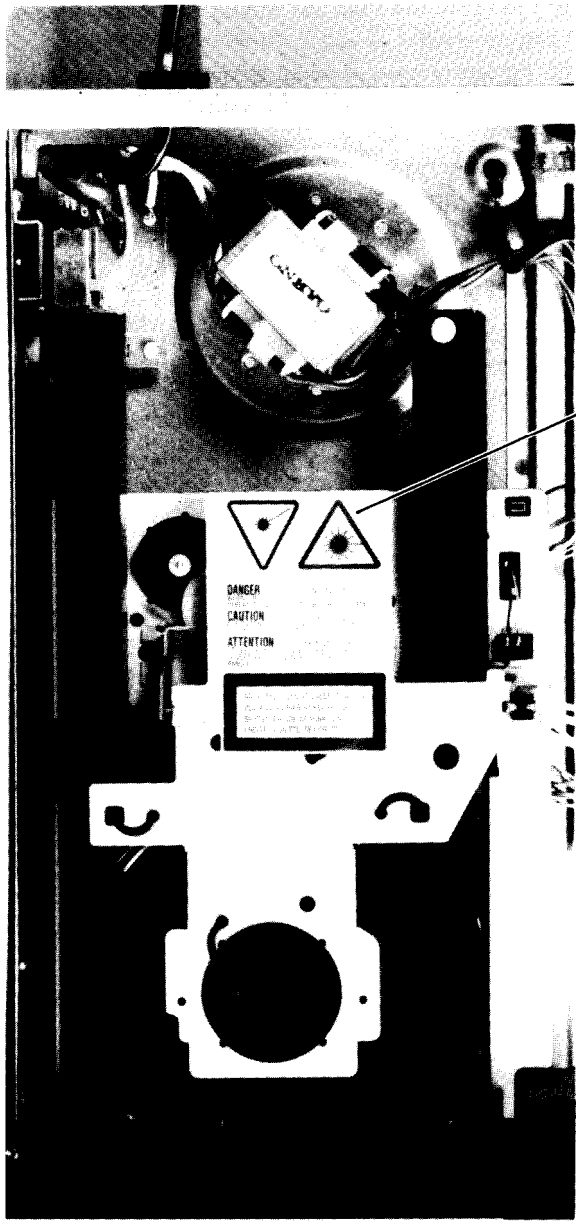
- Material: GaAS/GaAlAs
- Wavelength: 780nm
- Emission Duration: continuous
- Laser output: max. 0.5mW*

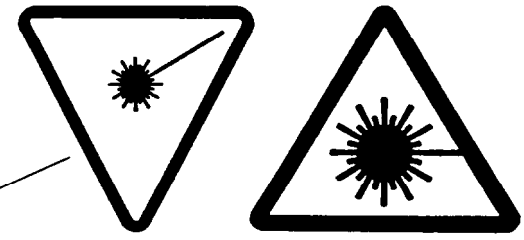
*This output is the value measured at a distance about 1.8mm from the objective lens surface on the Optical Pick-up Block.

LASER WARNING LABEL

The label shown below are affixed.

1. Warning label





DANGER —INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK FAILED OR DEFEATED. AVOID DIRECT EXPOSURE TO BEAM.

CAUTION —HAZARDOUS LASER AND ELECTROMAGNETIC RADIATION WHEN OPEN AND INTERLOCK DEFEATED.

ATTENTION —RAYONNEMENT LASER ET ELECTROMAGNETIQUE DANGEREUX SI OUVERT AVEC L'ECLENCHEMENT DE SECURITE ANNULE.

SN29360911

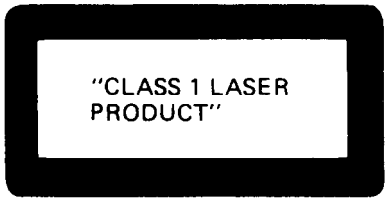
ADVARSEL: USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAF-BRYDER ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.

Photo 1

2. Certification label (Only UD:120V model)
This label is located on the back panel.

3. Class 1 label (Other models)
This label is located on the back panel.

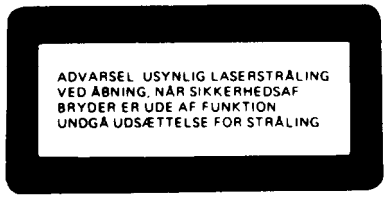
ADVARSEL



Denne mærkning er anbragt på apparatets højre side og indikerer, at apparatet arbejder med laserstråler af klasse 1, hvilket betyder, at der anvendes laserstråler af svageste klasse, og at man ikke på apparatets yderside kan blive udsat for utilladelig kraftig straling.

APPARATET BØR KUN ÅBNES AF FAGFOLK MED SÆRLIGT KENDSKAB TIL APPARATER MED LASERSTRÅLER!

Indvendigt i apparatet er anbragt den her gengivne advarselsmærkning, som advarer imod at foretage sadanne indgreb i apparatet, at man kan komme til at udsætte sig for laserstråling.



VAROITUS! Laite sisältää laserdiodin, joka lähettää (näkymätöntä) silmille vaarallista lasersäteilyä.

Fig. 8

NOTE ON COMPACT DISC

- **Holding Compact Discs**

Hold Compact Discs by the edges so that you do not touch the surface of disc. Remember that the side of the disc with the "rainbow" reflection is the side containing the audio information.

Do not attach tape or paper to the label side of the disc and always be careful not to leave fingerprints on the side that is played.

- **Storing Compact Discs**

Store Compact Discs in a location protected from direct sunlight, high heat and humidity and extremely high and low temperatures. Discs should never be left in the trunk or interior of an automobile in the sun since the temperature can become very high in such a closed environment.

Always store Compact Discs in the holders in which they were sold. Never leave a disc in the player's disc holder for a long period of time.

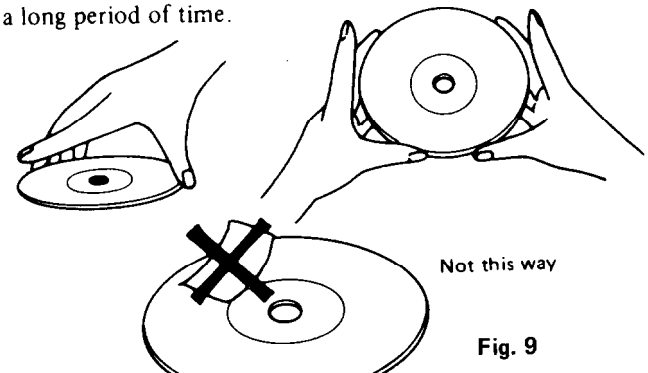


Fig. 9

- **Cleaning Compact Discs**

Before playing a disc wipe off the playing surface with a soft cloth to remove dust and other soil. Wipe the surface in straight lines from the center of the disc outward, not in a circular motion as you would with a phonograph record.

Do not use benzene, chemical cleansers or phonograph record cleaning solutions to clean Compact Discs. Also avoid static electricity prevention solutions since they can damage the surface of Compact Discs.

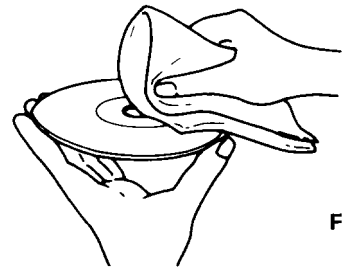


Fig. 10

Problems Caused by Dew

Dew can form inside a Compact player when it is brought from a cold environment into a warm room, when a room is rapidly heated and if a player is left in a humid environment.

This dew can prevent the laser pickup from reading the data contained in the pits in the disc surface. If the player does not operate properly because of dew, remove the disc and leave the player's power switch on for about one hour to remove all moisture.

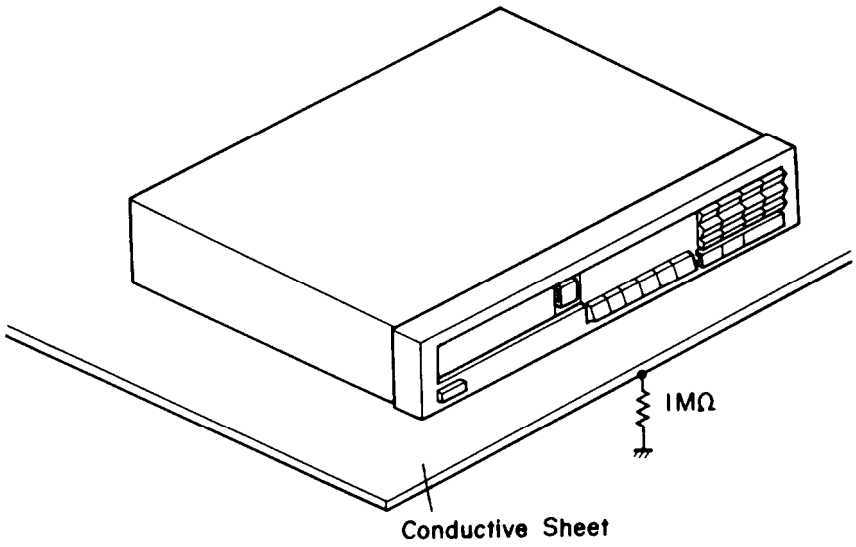
CAUTION ON REPLACEMENT OF PICK-UP

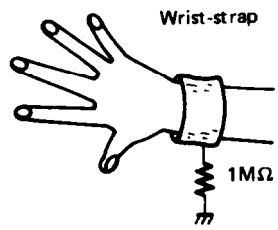
The laser diode in the optical pick-up block is so sensitive to static electricity, surge current and etc. that the components are liable to be broken down or its reliability remarkably deteriorated.

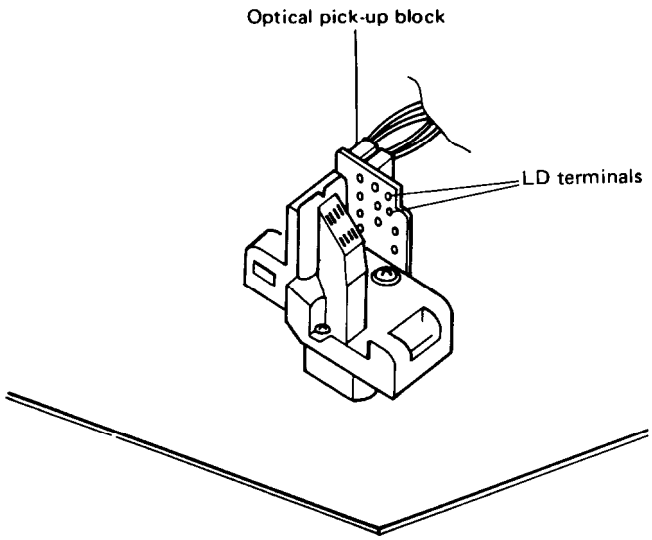
During repair, carefulley take the following precautions. (The following precautions are included in the service parts).

PRECAUTIONS

1. **Ground for the work-desk.**
   Place a conductive sheet such as a sheet of copper (with impedance lower than $10^6\,\Omega$) on the work-desk and place the set on the conductive sheet so that the chassis.
2. **Grounding for the test equipment and tools.**
   Test equipments and toolings should be grounded in order that their ground level is the same the ground of the power source.
3. **Grounding for the human body.**
   Be sure to put on a wrist-strap for grounding whose other end is grounded.
   Be particularly careful when the workers wear synthetic fiber clothes, or air is dry.
4. **Select a soldering iron that permits no leakage and have the tip of the iron well-grounded.**
5. **Do not check the laser diode terminals with the probe of a circuit tester or oscilloscope.**





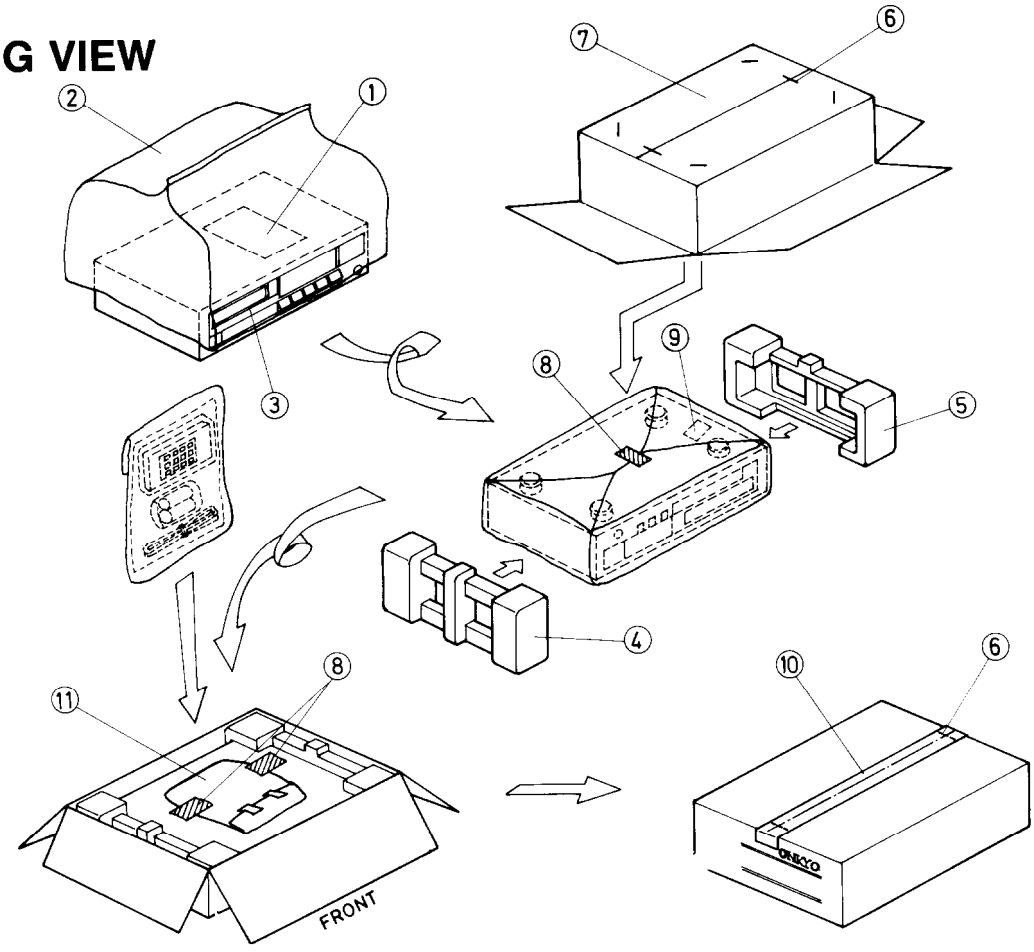


(Care should be taken with the optical pickup.)
The optical pickup is sensitive to static electricity, surge currents, and other high electrical noise, and because there is the possibility of damage to performance, in the handling of the pickup, the utmost care must be taken, particularly with regard to static electricity.

1. When replacing the optical pickup, first short the LD terminals and remove the connector. Also, when atatching the new optical pickup, after attaching the connector, unsolder the LD terminals.
2. Do not touch the optical pickup object lens with the hands.

Fig 11

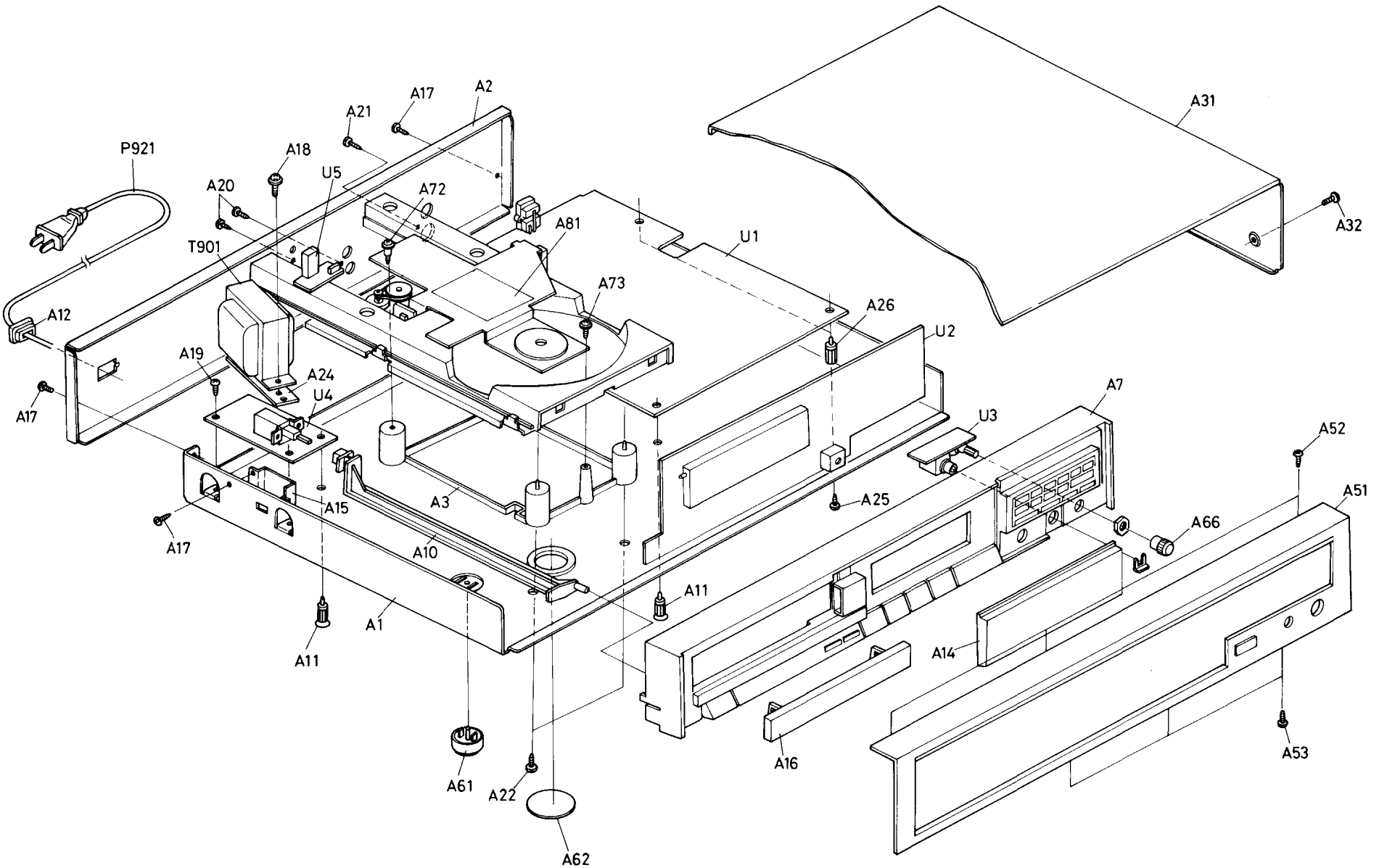
PACKING VIEW



REF.NO.	PART NO.	DESCRIPTION
1	29361011	Caution sheet
2	29100036A	550 ×850mm,Poly-vinyl bag
3	29095505	Protection sheet
4	29091238	Pad R
5	29091237	Pad L
6	282301	Sealing hook
7	29051678	Master carton box
8	261504	50×30mm,Adhesive tape
9	29361027	Caution label
10	260012	50×500mm,Damplon tape
11	Accessary bag ass'y	
	-120V models-	
	2010098A	Connection cord
	29341293	Instruction manual
	24140022	RC-120C,Remote control unit
	3010054	UM-3,Two batteries
	29100006A	350 ×250mm,Poly-vinyl bag
	2010169	Connection cord for remote control
	29365019	Warranty card (Only U.S. model)
	29358002E	Service staion list (Only U.S. model)
	-220V models-	
	2010098A	Connection cord
	29341294	Instruction manual
	29341295	Instruction manual,Italian
	24140022	RC-120C,Remote control unit
	3010054	UM-3,Two batteries
	29100006A	350 ×250mm,Poly-vinyl bag
	2010169	Connection cord for remote control
	-240V models-	
	2010098A	Connection cord
	29341231	Instruction manual
	29341294	RC-120C,Remote control unit
	3010054	UM-3,Two batteries
	29100006A	350 ×250mm,Poly-vinyl bag
	2010169	Connection cord for remote control

REF. NO.	PART NO.	DESCRIPTION
	Universal models-	
	2010098A	Connection cord
	29341294	Instruction manual
	29341295	Instruction manual,Italian
	24140022	RC-120C,Remote control unit
	3010054	UM-3,Two batteries
	29100006A	350 ×250mm,Poly-vinyl bag
	2010169	Connection cord for remote control
	25055040	CV-K-2,Conversion plug

EXPLODED VIEW



EXPLODED VIEW – PARTS LIST

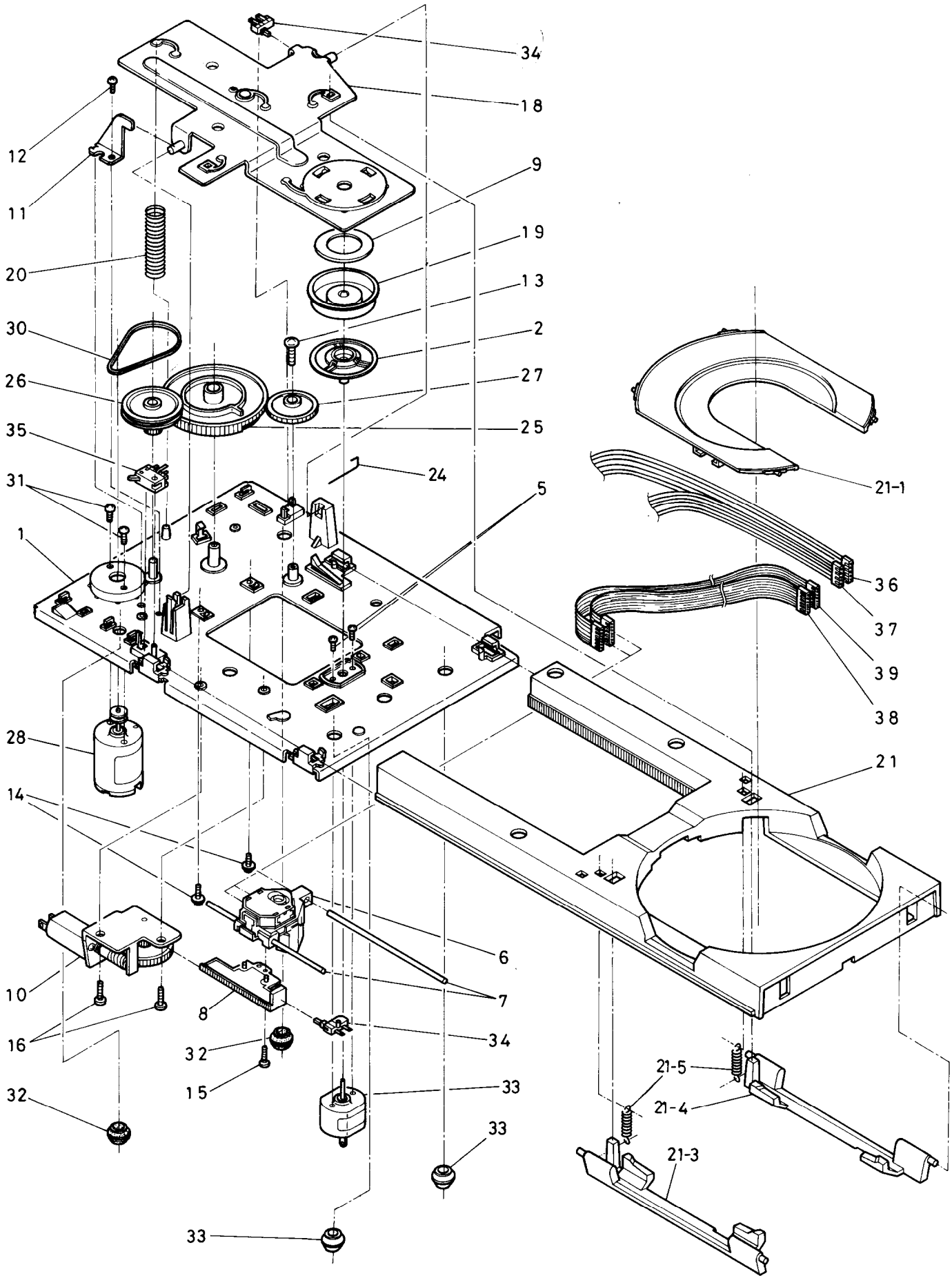
REF.NO.	PART NO.	DESCRIPTION
A1	27100159A	Chassis
A2	27121092	Back panel 〈D〉
	27121093	Back panel 〈G〉
	27121095	Back panel 〈U〉
	27121125	Back panel 〈Q〉
A3	27190612A	Holder, mechanism
A7	27110414A	Front bracket ass'y
A10	27273096A	Joint,power
A11	27190524	Holder
A12	27300750	⚠ Strainrelief
A14	28191462A	Clear plate
A15	27141125	Bracket S
A16	27210940A	Tray panel
A17	834430068	3TTS+6B(BC),Tapping screw
A18	830440109	4TTC+10C(BC), Tapping screw
A19	831130088	3TTW+8B,Tapping screw
A20	834430108	3TTS+10B(BC).Tapping screw
A21	834230108	3TTS+10B(Ni),Nickel screw
A22	833430080	3TTP+8P,Tapping screw
A23	831430100	3TTW+10P(BC),Tapping screw
A24	27270214A	Spacer
A25	833435082	3.5STP+8BQ(BC),Tapping screw
A26	27190063	KGTS-8T,Holder
A31	28184385	Top cover
A32	834430088	3TTS+8B(BC),Tapping screw
A51	1H041121	Front panel ass'y
A52	833430080	3TTP+8P(BC),Tapping screw
A53	834430068	3TTS+6B(BC),Tapping screw
A61	27175130	Leg
A62	27270255	Spacer
A66	28323325	Knob VOLUME
A72	801364	Special screw
A73	801410	Special screw
A81	29360911	Label, LASER
A91	27141090A	Bracket U 〈U〉
A92	834430088	3TTS+8B(BC),Tapping screw 〈U〉
P921	253112A	⚠ AS-UC-4#18,Power supply cord 〈D〉
	253148 or	⚠ AS-CEE 250V 2.5A,
	253150	Power supply cord 〈G/U〉
	253118	⚠ AS-SAA,Power supply cord 〈Q〉
S902	25065168	⚠ HXW0131-01-060,Voltage selector switch 〈U〉
T901	2300291	⚠ NPT-991D,Power transformer 〈D〉
	2300292	⚠ NPT-991G,Power transformer 〈G〉
	2300294	⚠ NPT-991ADGQ,Power transformer 〈U〉
	2300293	⚠ NPT-991Q, Power transformer 〈Q〉
U1	1H040586-5	NAAR-3086-5,Main circuit pc board ass'y 〈D/W〉
	1H040586-5A	NAAR-3086-5a, Main circuit pc board ass'y 〈G/Q〉

REF. NO.	PART NO.	DESCRIPTION
U2	1H040569-1	NADIS-3269-1,Display circuit pc board ass'y
U3	1H040570-1	NAAF-3270-1,Headphone amplifier pc board ass'y
U4	1H040572-1	NAPS-3272-1,Power supply circuit pc board ass'y
U5	1H040571-1	NAETC-3271-1,Terminal pc board ass'y
W1	260208	Binder

NOTE: 〈D〉:Only 120V model
〈G〉:Only 220V model
〈U〉:Only Universal model
〈Q〉:Only 240V model

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

MECHANISM EXPLODED VIEW



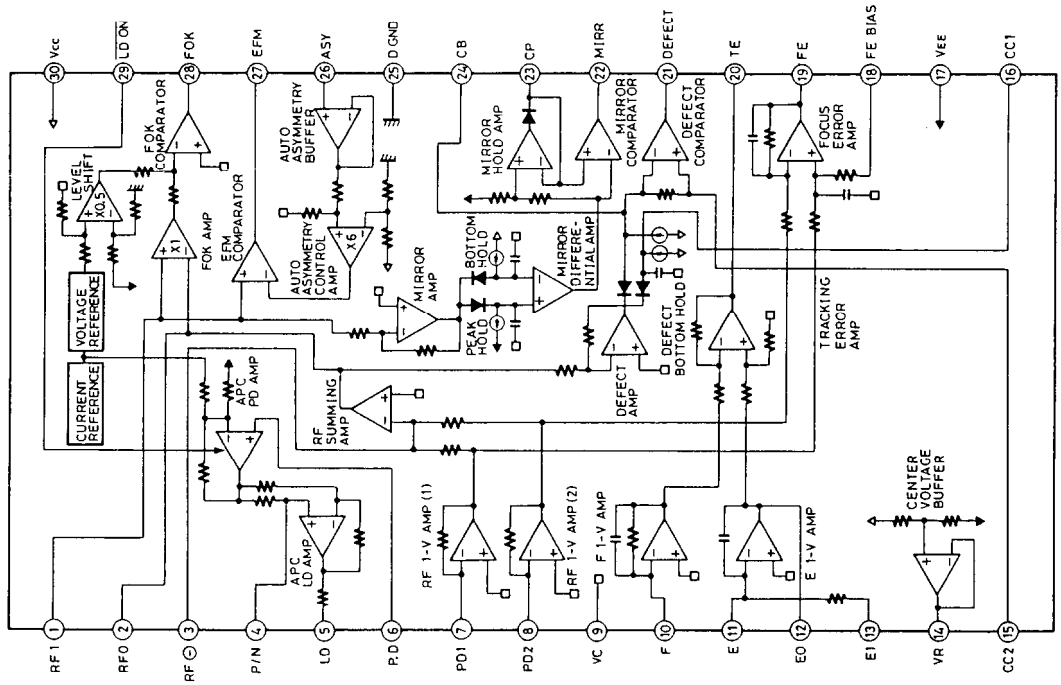
PARTS LIST

REF.NO.	PART NO.	DESCRIPTION
1	27100140F	Mechanism chassis
2	1H025903	Turntable ass'y
3	24502213A	Spindle motor
5	82142003	2P+3F(BC),Pan head screw
6	24110001	KSS-152A,Optical pick-up
7	27260222	Shaft
8	27300939	Rack
9	27270234	Spacer
10	1H025902	Slide motor ass'y
11	27141230	Bracket, holder
12	834430068	3TTS+6B(BC),Tapping screw
13	838426088	2.6TTB+8B(BC),Tapping screw
14	831430100	3TTW+10P(BC),Tapping screw
15	833420068	2TTP 6B(BC),Tapping screw
16	833430080	3TTP+8P(BC), Tapping screw
17	82142003	2P+3F(BC),Pan head screw
18	27300946F	Arm ass'y
19	27300848A	Cap CH
20	27180341A	Spring
~~21~~	~~27301112B~~	~~Disc tray~~
21-1	27301113	Disc plate
21-3	27301114	Disc lifter L
21-4	27301115	Disc lifter R
21-5	27180400	Spring
24	27180405	Spring
~~25~~	~~27300942B~~	~~Cam gear~~
26	27300943	Pulley gear
27	27300944	Gear
28	1H025901	Tray motor ass'y
30	27301079	Rubber belt
31	82143004	3P+4FN(BC),Pan head screw
32	27301107	Cushion rubber
33	27300854A	Cushion rubber
34	25065321	NMS-1113,Microswitch (S-002/S-003)
35	25065322	NMS-1214,Microswitch (S-001)
36	2000733B	NSAS-6P689,Socket ass'y,Tray motor
37	2000734B	NSAS-6P690,Socket ass'y,Spindle motor
38	2000753	NSAS-8P709,Socket ass'y,White
39	2000581D	NSAS-8P537,Socket ass'y,Red
40	27180408	Spring (Back left side)

Lubrication: FLOIL·····G902S(Part No. 260447)
Place·····Between Arm and Cam gear

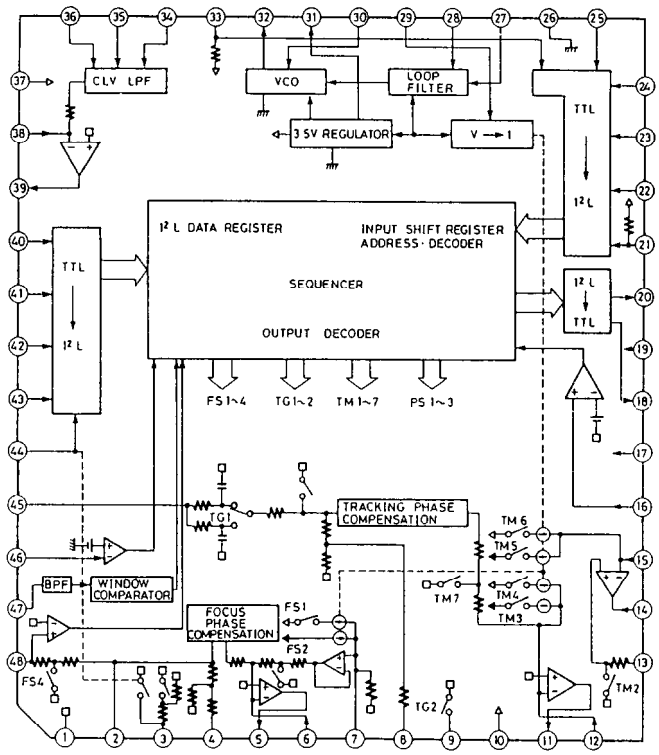
IC BLOCK DIAGRAM AND DESCRIPTIONS

CXA1081M (RF Amp)



Pin No.	Symbol	Function	Pin No.	Symbol	Function
1	RF I	Input terminal of output signal of RF summing amplifier via the coupling capacitor	16	CC1	Defect bottom hold output terminal
2	RFO	Output terminal of RF summing amplifier	17	V_{EE}	Negative power supply terminal
3	RF−	Input terminal of RF summing amplifier feedback	18	FE BIAS	Non-inversion bias terminal of focus error amplifier CMR adjustment of focus error amplifier
4	P/N	Switching terminal of P-SUB/N-SUB of LD (laser diode)	19	FE	Output terminal of focus error amplifier
5	LD	Output terminal of APC LD amplifier	20	TE	Output terminal of tracking error amplifier
6	PD	Input terminal of APC PD (Pin diode) amplifier	21	DEFECT	Output terminal of defect comparator
7	PD1	Inversion input terminal of RF I-V amplifier (1) Connect to A+C of PIN diodes.	22	MIRR	Output terminal of mirror comparator
8	PD2	Inversion input terminal of RF I-V amplifier (2) Connect to B+D of PIN diodes.	23	CP	Connection terminal of capacitor for mirror hold Non-inversion input of mirror comparator
9	VC	Connect to GND.	24	CB	Connection terminal of capacitor for defect bottom hold
10	F	Inversion input terminal of F I-V amplifier Connect to F of PIN diode.	25	DGND	Connect to GND
11	E	Inversion input terminal of E I-V amplifier Connect to E of PIN diode.	26	ASY	Auto asymmetry control input terminal
12	E0	Output terminal of E I-V amplifier	27	EFM	Output terminal of EFM comparator
13	E1	Feedback input terminal of E I-V amplifier Gain adjustment of E I-V amplifier	28	FOK	Output terminal of FOK comparator
14	VR	DC voltage output terminal of (Vcc + V_{EE})/2	29	$\overline{\text{LD ON}}$	ON/OFF switching terminal of laser diode
15	CC2	Input terminal from defect bottom hold output signal via the coupling capacitor	30	Vcc	Positive power supply

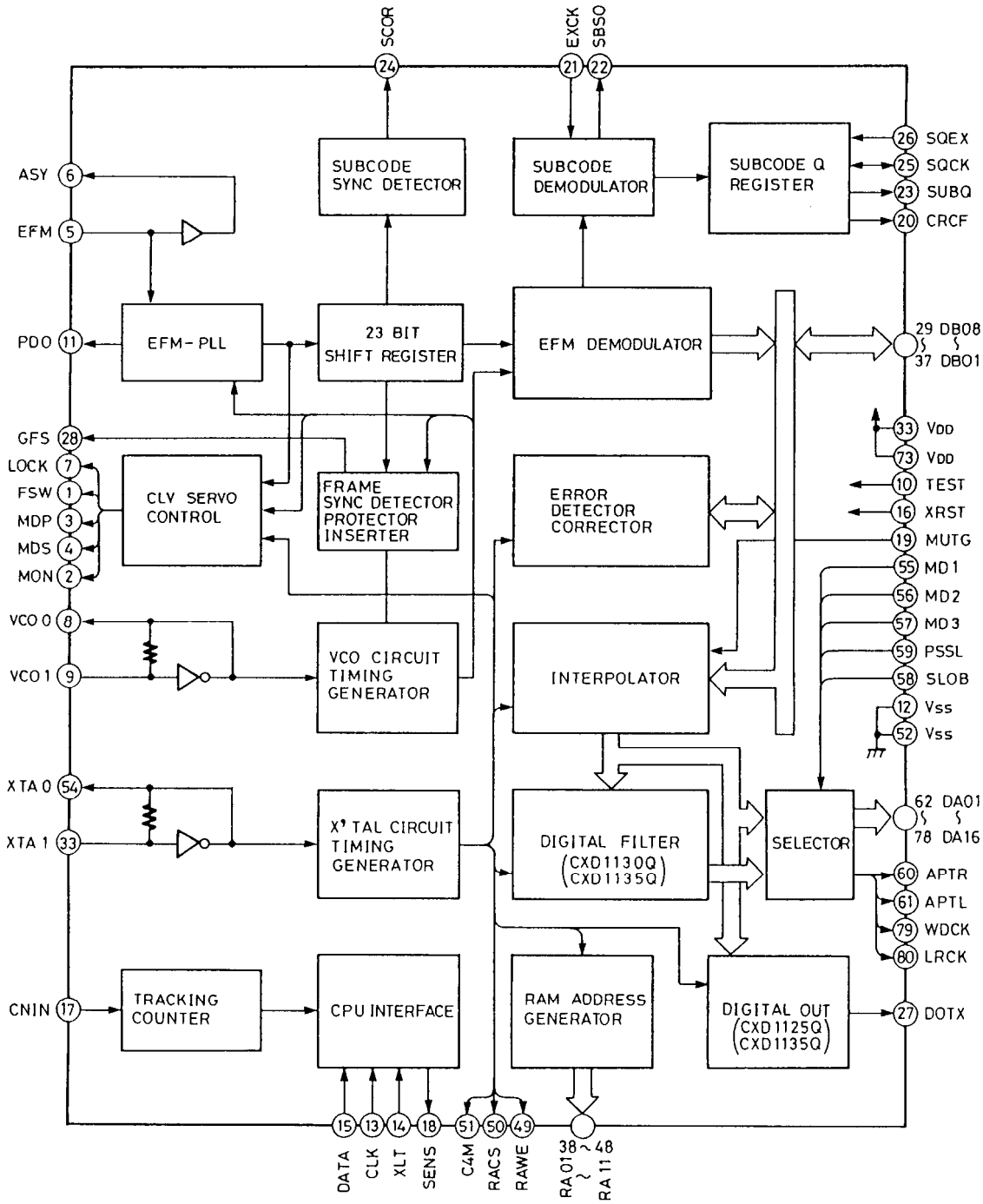
CXA1082AQ (Servo Signal Processor)



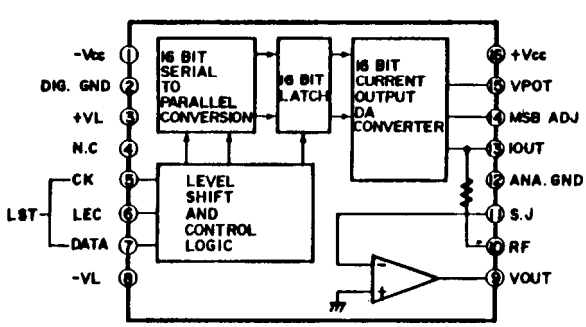
Pin No.	Symbol	Function
2	FGD	Insert the capacitor between this terminal and pin 3 when drop the high frequency gain of focus servo
3	FS3	Switching terminal of high frequency gain of focus servo
4	FLB	Time constant switching terminal when raise the low frequency gain of focus servo
5 11 14 39	FEO TAO SLO SPDLO	Operation amplifier output terminals for power transistor drive
6	FE−	Inversion input terminal of focus amplifier
7	SRCH	Time constant terminal to make the focus search waveform
8	TGU	Time constant terminal for high frequency gain switching of tracking
9	TG2	Time constant terminal for high frequency gain switching of tracking
12	TA−	Inversion input terminal of tracking amplifier
13	SL+	Non-inversion input terminal of sled amplifier
15	SL−	Inversion input terminal of sled amplifier
16	SSTOP	Limit switch ON/OFF detector signal terminal for disc innermost position detector
17	FSET	Terminal of peak of phase compensation of focus tracking and of setting of LPF
18 20	SENS C.OUT	Output terminals for microcomputer and interface
27	BW	Time constant terminal of loop filter

Pin No.	Symbol	Function
28	PDI	Input terminal of phase comparator output PDO
21 22 23 24 25 33	DIRCT XRST DATA XTL CLK LOCK	Input terminals for microcomputer and interface
29	ISET	Flow the current to decide the focus search, track jump, and kick height
30	VCOP	VCO free run frequency is proportion to resistor value between pins 30 and 31
32	C864	VCO (8.64MHz) output terminal
34	MDP	Connection terminal to terminal MDP of CXD1135Q
35	MON	Connection terminal to terminal MON of CXD1135Q
36	FSW	LPF time constant terminal of CLV servo error signal
38	SPDL−	Inversion input terminal of spindle drive amplifier
40 41 42 44	WDCK FOK MIRR DFCT	Input terminals for microcomputer and interface
45	TE	Tracking error signal input terminal
46	TZC	Tracking zero cross comparator input terminal
47	ATSC	Window comparator input terminal for ATSC detection
48	FE	Focus error signal input terminal

CXD1135Q (Digital Signal Processor)



PCM-56P–L (D/AConverter)

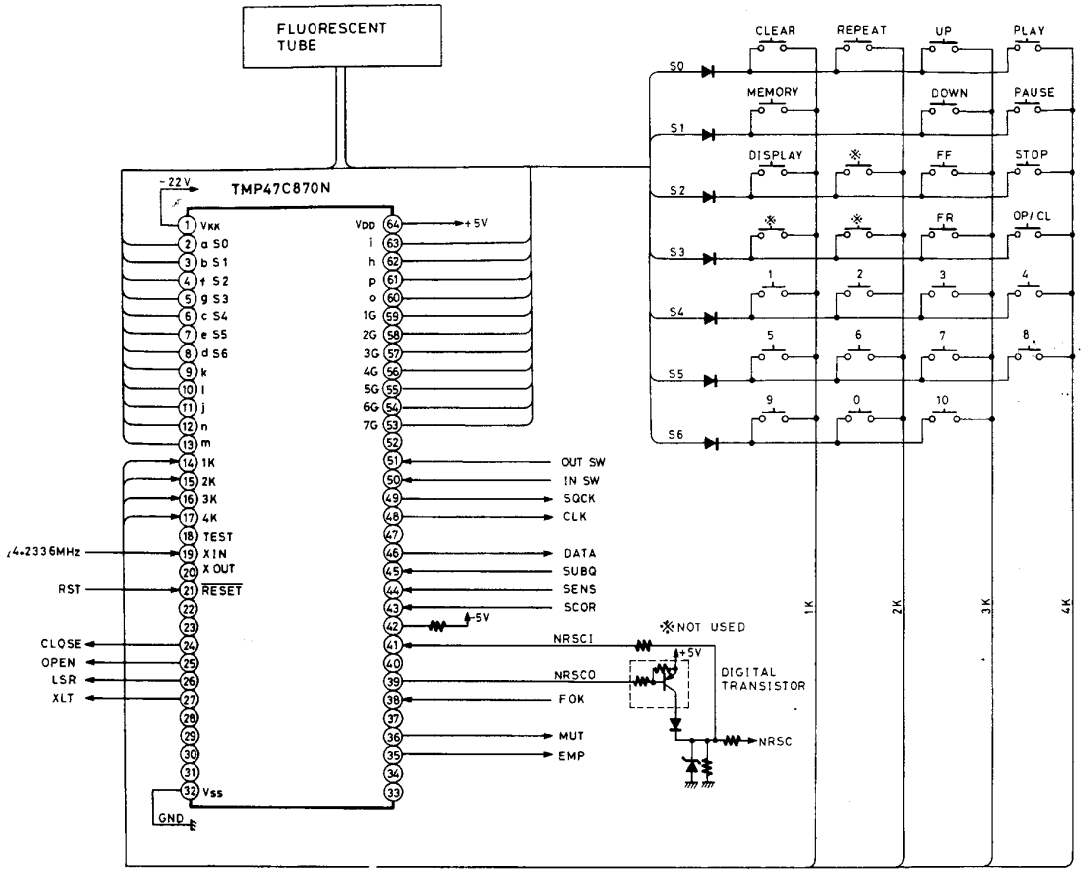


1	−Vcc	Analog power supply(−)
2	DIG GND	Digital ground
3	+VL	Logic voltage (+)
4	N.C	Not used
5	CK	Clock input
6	LEC	Latch enable input
7	DATA	Data input
8	−VL	Logic voltage (−)
9	VOUT	Output
10	RF	Feedback register
11	SJ	Operation amplifier input
12	ANA GND	Analog ground
13	IOUT	Current output
14	MSB ADJ	MSB adjustment terminal
15	VPOT	Meter terminal
16	+Vcc	Analog power supply (+)

Pin No.	Symbol	Function
1	FSW	Time constant switching output terminal of output filter of spindle motor
2	MON	ON/OFF control output terminal of spindle motor
3	MDP	Drive output terminal of spindle motor. Rough control when mode CLV-S and phase control when mode CLV-P
4	MDS	Drive output terminal of spindle motor. Speed control when mode CLV-P
5	EFM	EFM signal input terminal from RF amplifier
6	ASY	Output terminal to control the slice level of EFM signal
7	LOCK	GFS sampling terminal
8	VCOO	VCO output terminal. 8.6436MHz when lock to EFM signal
9	VCOI	VCO input terminal
10	TEST	0V
11	PDO	Phase comparator output terminal of EFM signal and VCO/2
12	Vss	Ground
13	CLK	Serial data transmitter clock input terminal from microcomputer
14	XLT	Latch input terminal from microcomputer
15	DATA	Serial data input terminal from microcomputer
16	XRST	System rest input terminal. Reset at low level.
17	CNIN	Tracking pulse input erminal
18	SENS	Inner condition output terminal correspond to address
19	MUTG	Muting input terminal
20	CRCF	CRC check output terminal of subcode Q
21	EXCK	Clock input terminal for serial output of subcode
22	SBSO	Serial output terminal of subcode
23	SUBQ	Subcode Q output terminal
24	SCOR	Subcode sink S0 + S1 output terminal
25	SQCK	Clock terminal to read the subcode Q
26	SQEX	Selector input terminal of SQCK
27	DOTX	Digital output terminal
28	GFS	Indicator output of lock condition of frame sync
29 ~ 32	DB08 ~ DB05	Data terminals of external RAM
33	V_{DD}	+5V
34 ~ 37	DB04 ~ DB01	Data terminals of external RAM
38 ~ 48	RA01 ~ RA11	Address output terminals of external RAM

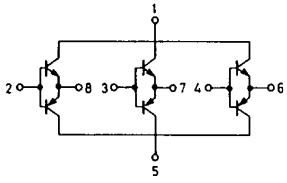
Pin No.	Symbol	Function
49	RAWE	Write enable signal output to external RAM
50	RACS	Chip selector signal output to external RAM
51	C4M	Divider output of crystal. f=4.2336MHz
52	Vss	Ground
53	XTAI	Input terminal of crystal oscillator
54	XTAO	Output terminal of crystal oscillator
55 ~ 57	MD1 ~ MD3	Mode switching input terminals
58	SLOB	Code switching input of audio data output.
59	PSSL	Mode switching input of audio data output. Serial output at low level. Parallel output at high level
60	APTR	Control output for aperture correction. High level when Rch.
61	APTL	Control output for aperture correction. High level when Lch.
62	DA01	DA01 (LSB of parallel sound output) output when PSSL = H. C1F1 output when PSSL = L
63	DA02	DA02 output when PSSL = H. C1F2 output when PSSL = L.
64	DA03	DA03 output when PSSL = H. C2F1 output when PSSL = L.
65	DA04	DA04 output when PSSL = H. C2F2 output when PSSL = L.
66	DA05	DA05 output when PSSL = H. C2FL output when PSSL = L.
67	DA06	DA06 output when PSSL = H. C2PO output when PSSL = L.
68	DA07	DA07 output when PSSL = H. RFCK output when PSSL = L.
69	DA08	DA08 output when PSSL = H. WFCK output when PSSL = L.
70	DA09	DA09 output when PSSL = H. PLCK output when PSSL = L.
71	DA10	DA10 output when PSSL = H. UGFS output when PSSL = L.
72	DA11	DA11 output when PSSL = H. GTOP output when PSSL = L.
73	V_{DD}	Power supply (5V)
74	DA12	DA12 output when PSSL = H. RAOV output when PSSL = L.
75	DA13	DA13 output when PSSL = H. C4LR output when PSSL = L.
76	DA14	DA14 output when PSSL = H. C210 output when PSSL = L.
77	DA15	DA15 output when PSSL = H. C210 output when PSSL = L.
78	DA16	DA16 (MSB of parallel sound output) output when PSSL = H. DATA output when PSSL = L
79	WDCK	Strobe signal output. 176.4kHz when DF is on. 88.2kHz when DF is off.
80	LRCK	Strobe signal output. 88.2kHz when DF is on. 44.1kHz when DF is off.

TMP47C870N(Microprocessor)

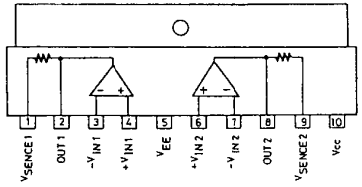


Pin No.	Terminal	I/O	Description
1	Vkk		Power supply terminal(21V)
2~13	a~g, j~m	O	Fluorescent tube segment drive output and key matrix output signal(a~g)
14~17	1K~4K	I	Input terminal from operation keies.
19	C4M	I	Clock input terminal from X'tal(4.2336 MHz)
21	RST	I	Reset input terminal
24	CLOSE	O	L level during the tray closes.
25	OPEN	O	L level during the tray opens.
26	LSR	O	L level when the laser turns on.
27	XLT	O	Interface of signal processor IC.
32	GND		Ground terminal
35	EMPHASIS	O	Emphasis switching signal output. Active H
36	MUTING	O	Muitng switching signal output. Active H
38	FOK	I	Focus OK input terminal. Focus OK at high level.
39	NRSC OUT	O	Remote control signal output terminal.
41	NRSC IN	I	Remote control signal input terminal.
43	SCOR	I	Subcode synchronizing signal input terminal.
44	SENS	I	Interface of signal processor IC.
45	SUBQ	I	Sub code Q input terminal.
46	DATA	O	Serial data signal output terminal
48	CLK	O	Serial data transmission clock
49	SQCK	I/O	Read clock of sub code Q
50	IN SW	I	L level at the arm down.
51	OUT SW	I	L level at the tray open.
53~59	1G~7G	O	Output terminals of grid of fluorescent tube
60~63	h, i, o. p	O	Fluorescent tube segment output terminals.
64	V_{DD}		Power supply terminal.

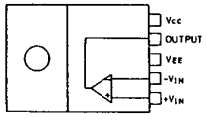
STA341M-L(Transistor Array)



LA6510 (Power OP Amp)



LA6500 (Power OP Amp)



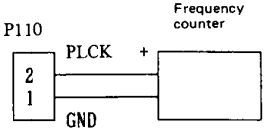
ADJUSTMENT PROCEDURES

Instruments required

Dual trace oscilloscope, Frequency counter, CR oscillator, Test disc (SONY YEDS-18), AC voltmeter, Sockets P109 & P110 (Part No. 25050089) P108 (Part No. 25050138)

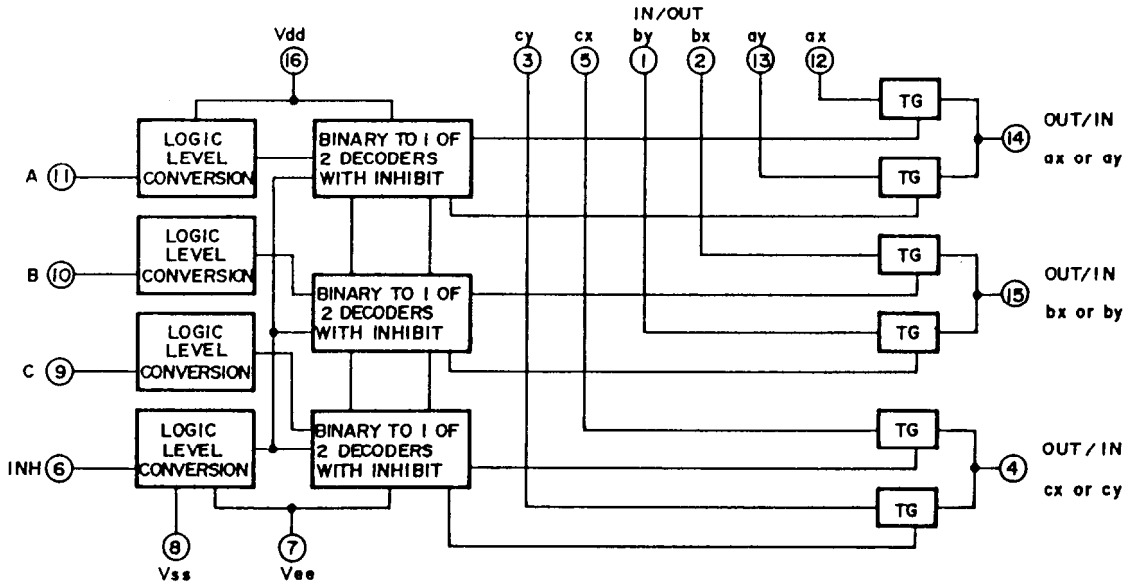
1. VCO frequency adjustment

Connect the frequency counter to terminal P110.
Turn the power switch to ON.(No load the disc).
Adjust R147 until the frequency counter reading becomes 4322 ± 5kHz.
After adjustment, disconnect the frequency counter.

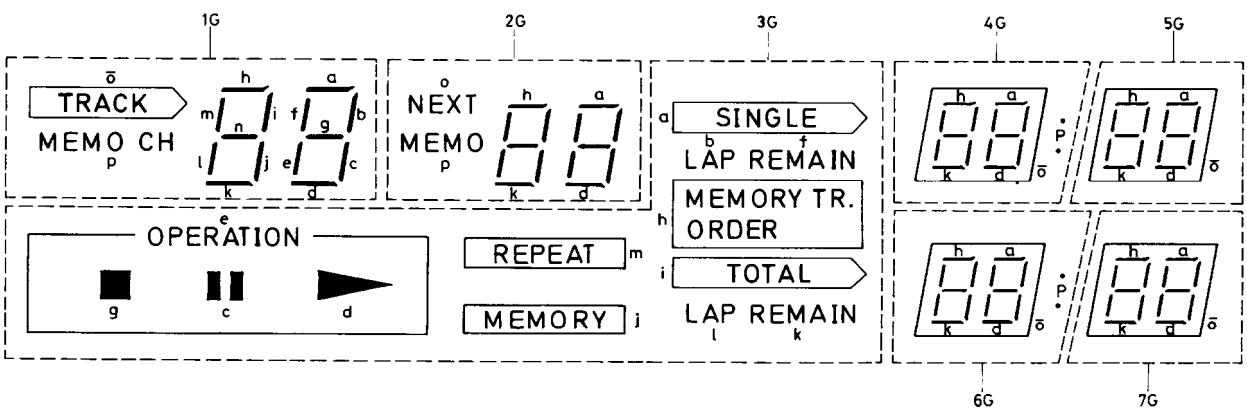


Use the high impedance probe. (10:1)

BU4053B(Analog Switch)



7- BT-93GK(Fluorecent indicator tube)



PIN CONNECTION

PIN No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CONNECTION	F1	F1	NP	NP	7G	6G	5G	4G	3G	2G	1G	o	p	h	i	NP	NP	NP
PIN No.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
CONNECTION	NP	m	n	j	l	k	d	e	c	g	f	b	a	NP	NP	F2	F2	

2. Focus offset adjustment

Load the test disc (YEDS-18) on the tray and play back the track 2.
Connect the oscilloscope to terminal P109.
Adjust R110 until a clear trace of waveform pattern as shown photo 1 appear on the oscilloscope.
(When the amount of jitter is broad, set R110 to mechanical center)
After adjustment, disconnect the oscilloscope.

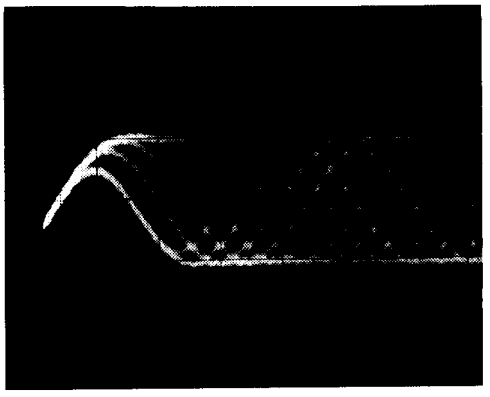
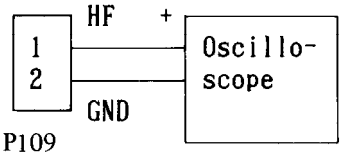


Photo 1



Oscilloscope range
Vertical: 0.2V/div
Holizontal: 0.2μS/div
Use the high impedance probe.

3. Tracking offset adjustment

Play back the track 2 of test disc.
Turn R125 to minimum position(counter-clockwise).
Connect the oscilloscope between pin 3(TR) of P108 and pin 2(GND) of P109.
Adjust R108 until the center of tracking error signal on the oscilloscope becomes GND level.
Turn R125 to mechanical center.
After adjustment, disconnect the oscilloscope.

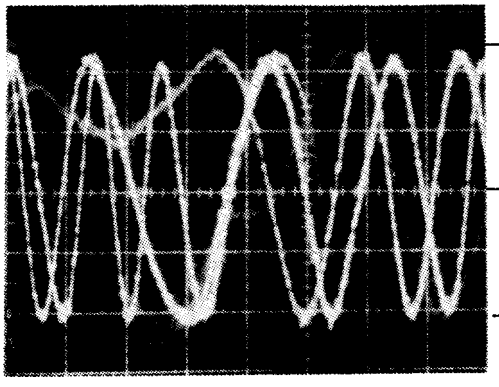
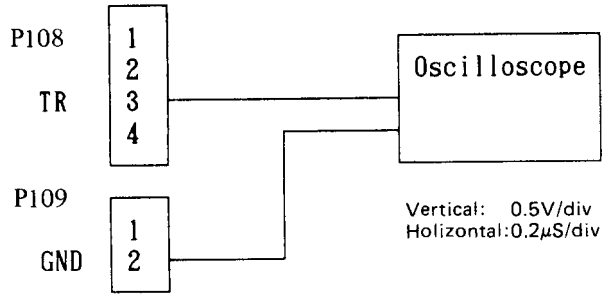


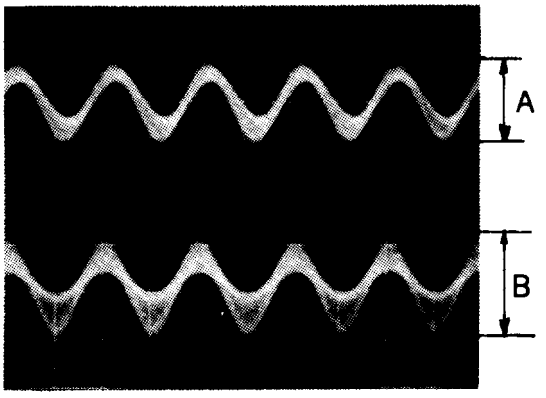
Photo 2

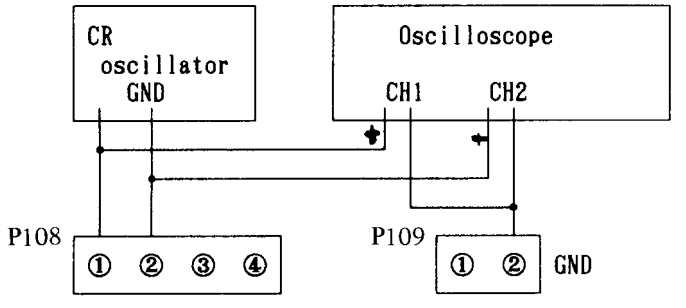


Vertical: 0.5V/div
Holizontal:0.2μS/div

4. Focus gain adjustment

Set the output of CR oscillator to 800Hz, 1~1.5Vp-p.
Play back the track 2 of test disc.
Connect the oscilloscope and the CR oscillator as shown below.



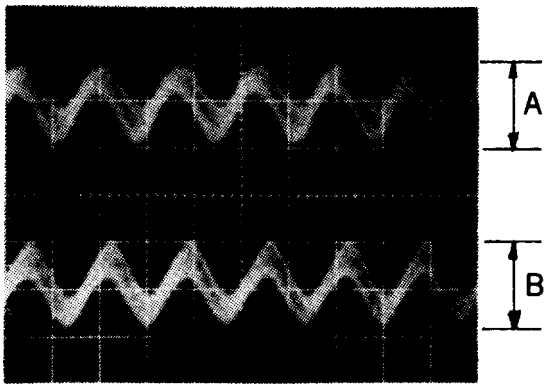


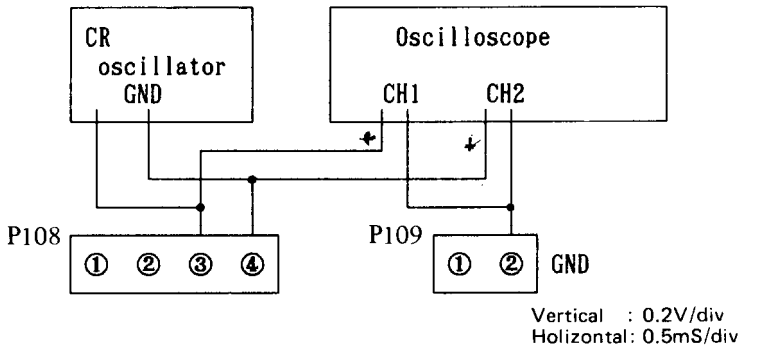
Vertical : 0.2V/div
Holizontal: 0.5mS/div

Adjust R122 until 800Hz components of CH1 and CH2 on oscilloscope become same level.
After adjustment, disconnect the CR oscillator and the oscilloscope.

5. Tracking gain adjustment

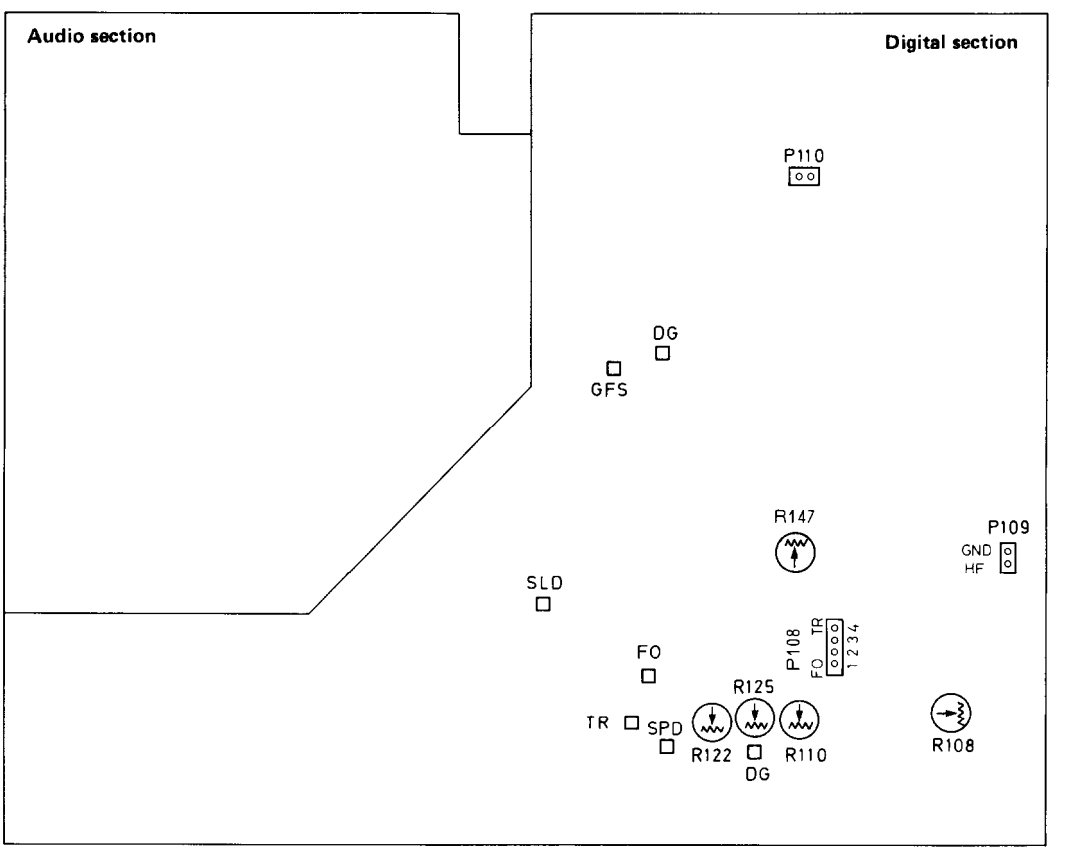
Set the output of CR oscillator to 1.2kHz, 1~1.5Vp-p.
Play back the track 2 of test disc.
Connect the oscilloscope and the CR oscillator as shown below.



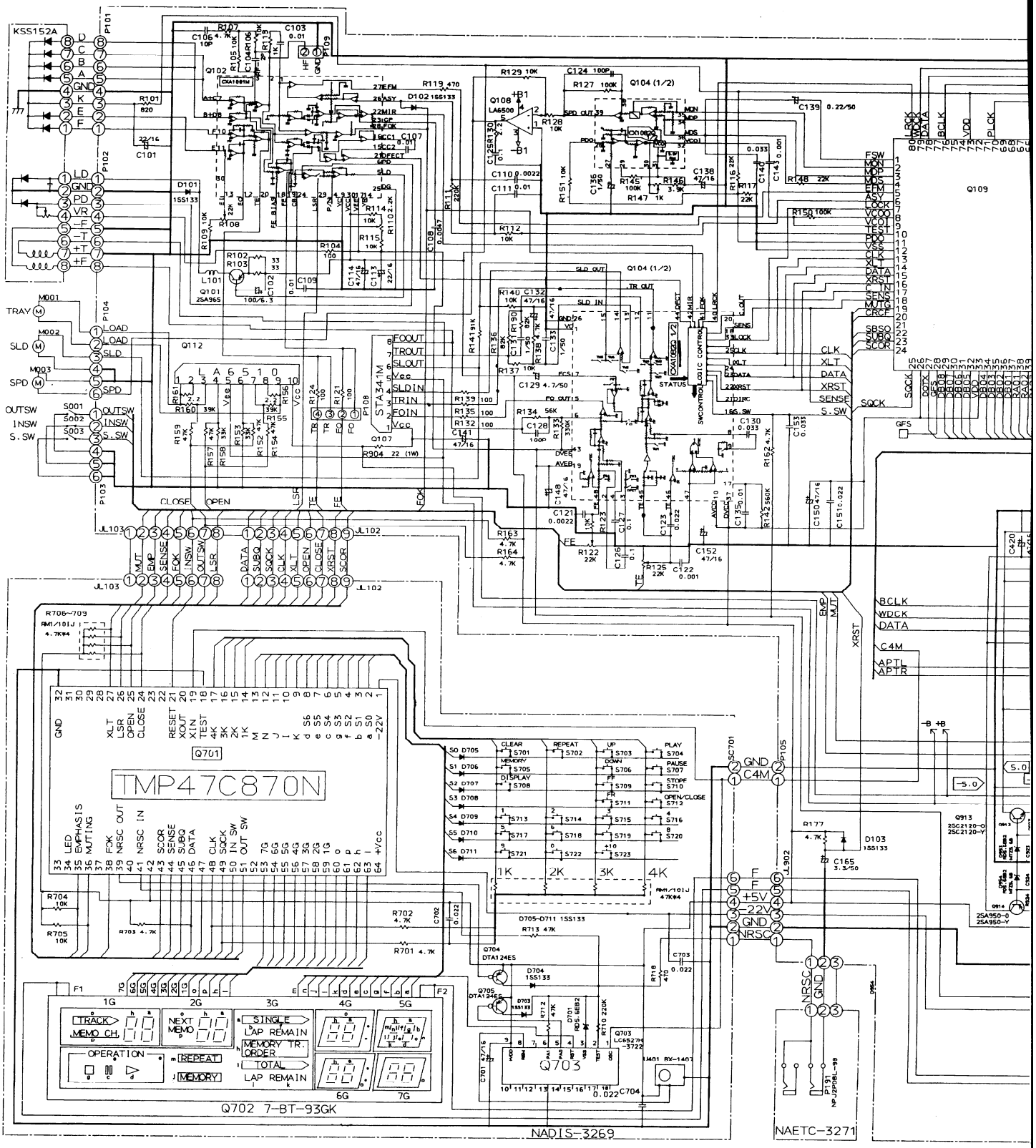


Adjust R125 until 1.2kHz components of CH1 and CH2 on oscilloscope becomes same level.

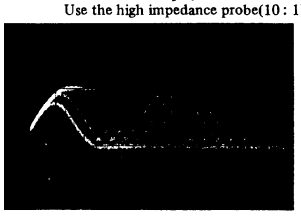
After adjustment, disconnect the CR oscillator and the oscilloscope.



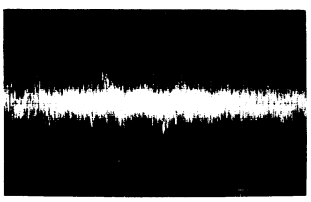
SCHEMATIC DIAGRAM



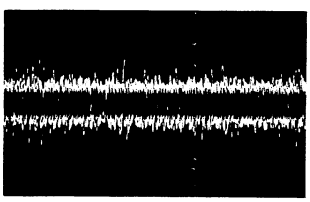
Waveform when play the track 2 of test disc YEDS-18.
Use the high impedance probe(10 : 1)



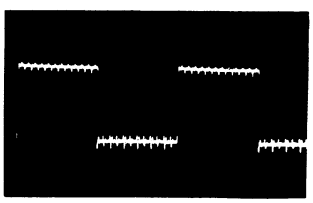
RF signal
P109 Pin2 (HF)
V:50mV/div.
H:0.5μs/div.



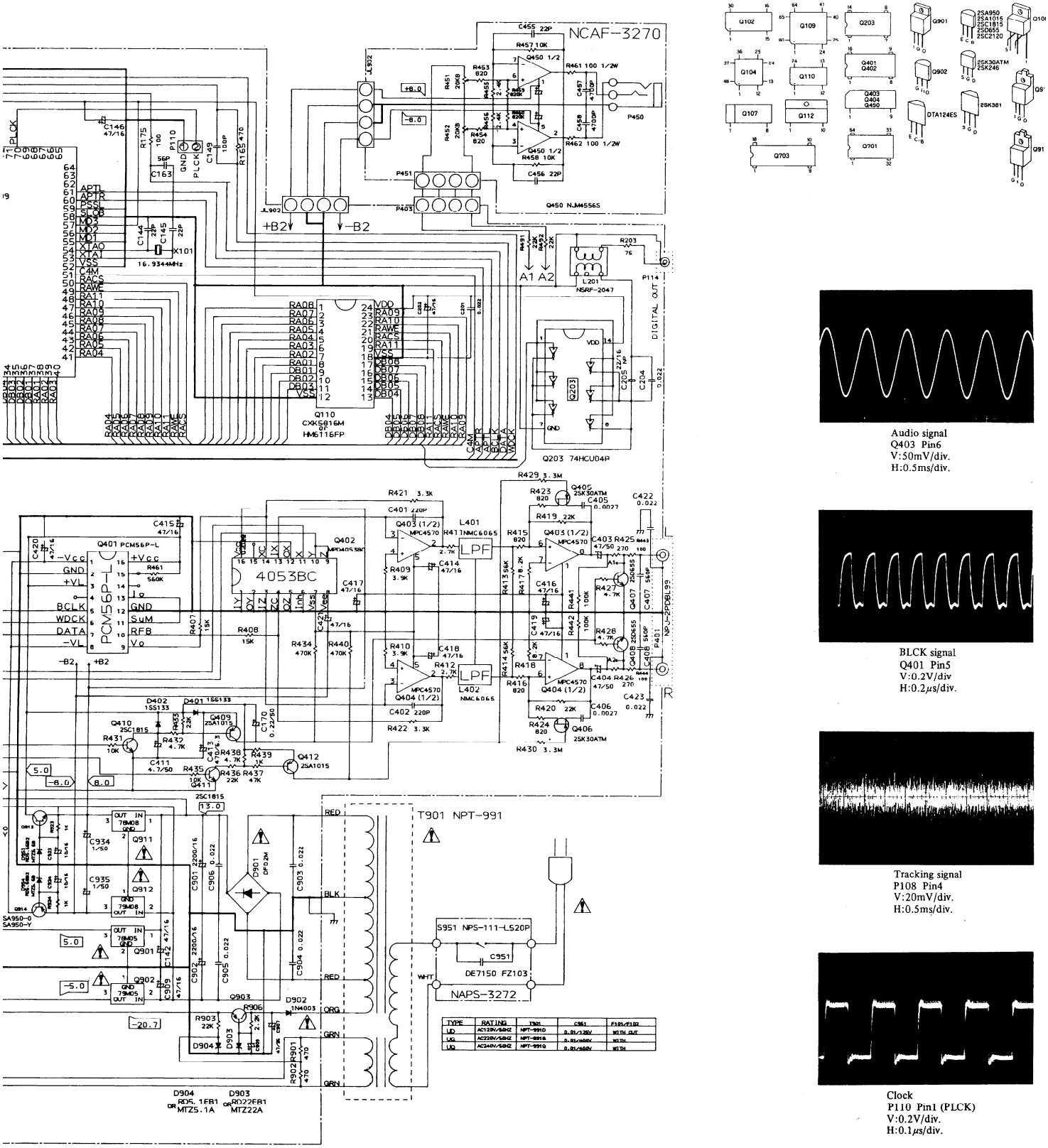
Focusing signal
P108 Pin2
V:10mV/div.
H:0.5ms/div.



Tracking signal
Q107 Pin3
V:0.1 V/div.
H:0.5ms/div.



WDCK
Q401 Pin6
V:0.2V/div.
H:1μs/div.

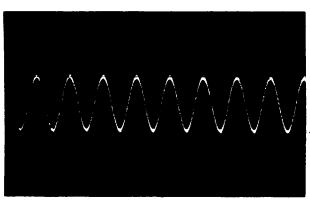


Audio signal
Q403 Pin6
V:50mV/div.
H:0.5ms/div.

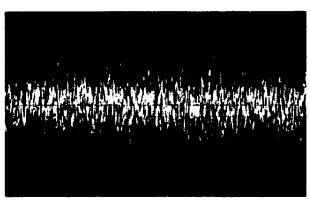
BLCK signal
Q401 Pin5
V:0.2V/div
H:0.2μs/div.

Tracking signal
P108 Pin4
V:20mV/div.
H:0.5ms/div.

Clock
P110 Pin1 (PLCK)
V:0.2V/div.
H:0.1μs/div.

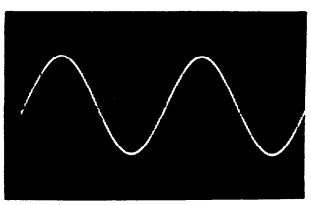


Clock
Q109 Pin53 (C145)
V:0.2V/div.
H:0.1μs/div.



Focusing signal
Q107 Pin2
V:50mV/div.
H:0.5ms/div.

DATA signal
Q401 Pin7
V:0.2V/div .
H:0.1μs/div.



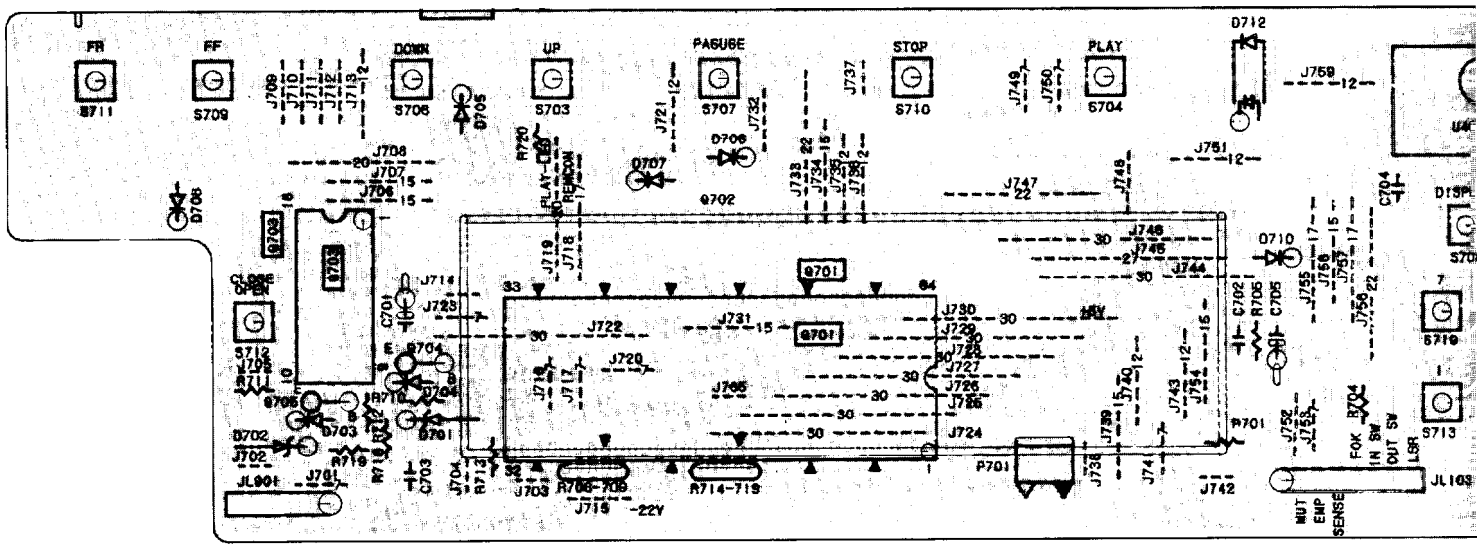
Q401 Pin10
V:0.1V/div.
H:0.2ms/div.

PRINTED CIRCUIT BOARD – PARTS LIST

MAIN CIRCUIT PC BOARD(NAAR-3086-5/5A)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q102	22240029	CXA1081M
Q104	22240030	CXA1082AQ
Q107	22240168	STA341M-L
Q108	22240033	LA6500
Q109	22240031	CXD1135Q
Q110	22240142,	CXK5816MS-15,
	222990 or	CXK5816M-15 or
	22240032	LC3517AM-15
Q112	22240034	LA6510
Q203	222755	74HCU04P
Q401	22240096	PCM56P-L
Q402	222840531ROH	BU4053B
Q403,Q404	22240014	μPC4570HA
Q901	222780052	78M05
Q902	222790053	79L05
Q911	222780085MIT	M5F78M08L
Q912	222790085MIT	M5F79M08L
	Transistors	
Q101,Q903	2211503 or	2SA950-O or
Q914	2211504	2SA950-Y
Q405,Q406	2212375	2SK30ATM-GR
Q407,Q408	2211705 or	2SD655-E or
	2211706	2SD655-F
Q409,Q412	2211454 or	2SA1015-Y or
	2211455	2SA1015-GR
Q410,Q411	2211254 or	2SC1815-Y or
	2211255	2SC1815-GR
Q913	2211163 or	2SC2120-O or
	2211164	2SC2120-Y
	Diodes	
D101-D103	223163	1SS133
D401,D402	223163	1SS133
D901	223892	DF02M
D902	223880 or	GP101N4003 or
	223896	1N4003F
D903	2239751 or	RD22EB1 or
	2243492	MTZ22A
D904	2239451 or	RD5.1EB1 or
	2243141	MTZ5.1A
D953,D954	2239472 or	RD5.6EB2 or
	2243152	MTZ5.6B
	X'tal	
X101	3010112	KD6586FFB
	Coils	
L101	231023	NCH1062
L201	232143	NSRF-2047
L401,L402	232141	NMC-6065
	Capacitors	
C101,C113	354742209	22μF,16V,Elect.
C102	354721019	100 μF,6.3V,Elect.
C114	354744709	47μF,16V,Elect.
C129	354780479	4.7 μF,50V,Elect.
C132,C138	354744709	47μF,16V,Elect.
C133,C136	354780109	1μF,50V,Elect.
C139	354781099	0.1 μF,50V,Elect.
C141,C142	354744709	47μF,16V,Elect.
C146,C148	354744709	47μF,16V,Elect.
C150,C152	354744709	47μF,16V,Elect.
C158,C159	354744709	47μF,16V,Elect.
C165	354780339	3.3μF,50V,Elect.
C170	352981096	0.1 μF,50V,Non-polar elect.
C202	354744709	47μF,16V,Elect.
C205	352942206	22μF,16V,Non-polar elect.
C401,C402	373302214	220pF ±5%,125V,PP

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



DISPLAY CIRCUIT PC BOARD

PRINTED CIRCUIT BOARD-PARTS LIST

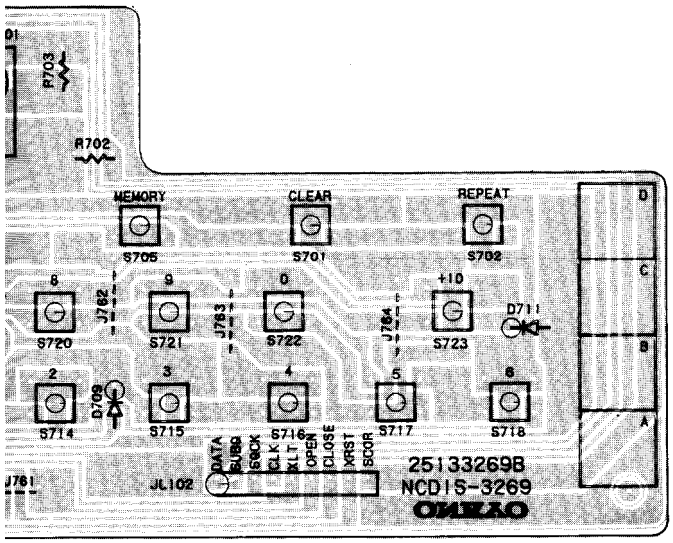
CIRCUIT NO.	PART NO.	DESCRIPTION
C403,C404	392884707	47 μF,50V,Low-leakage current elect.
C407,C408	373305614	560 pF ± 5%,125V,PP
C411	354780479	4.7 μF,50V,Elect.
C413	354724719	470 μF, 6.3V,Elect.
C414-C421	354744709	47 μF,16V,Elect.
C901,C902	354742229	2200 μF,16V,Elect.
C907	354764709	47 μF,35V,Elect.
C908	354754709	47 μF,25V,Elect.
C909	354744709	47 μF,16V,Elect.
C923,C924	354741009	10 μF,16V,Elect.
C934,C935	354780109	1 μF,50V,Elect.
	Resistors	
R108	5210066	N06HR22KBD,Semi-fixed
R110	5210060	N06HR2.2KBD,Semi-fixed
R122,R125	5210066	N06HR22KBD,Semi-fixed
R147	5210058	N06HR1KBD,Semi-fixed
R904	441622704	27Ω,1W,Metal oxide film
	Plugs	
P101	25055153	NPLG-9P137
P102	25055152	NPLG-8P136
P103,P104	25055150	NPLG-6P134
P105	25055146	NPLG-2P130
P108	25055045	NPLG-4P33
P109,P110	25055038	NPLG-2P29
P403	25055148	NPLG-4P132
	Sockets	
JL102	25050273	NSCT-9P101
JL103	25050272	NSCT-8P100
JL901	25050270	NSCT-6P98
JL902	25050268	NSCT-4P96
	Terminals	
P114	25045237	NPJ-1PDOR-111
P401	25045223	NPJ-2PDBL99
	Radiator	
	27160211-1	RAD68B
	Screw	
	82143006	3P+6FN(BC),Pan head
	fuses	
F101,F102	252112	ICPN15,IC protector ⟨G⟩

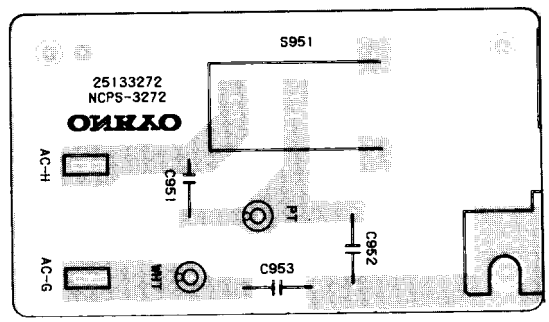
DISPLAY CIRCUIT PC BOARD(NADIS-3269-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q701	22240154	TMP47C870N
Q703	22240173	LC6527H-3722 or LC6527H-3659 (Refer CAUTION)
	Fluorescent tube	
Q702	212052	7-BT-93GK
	Transistors	
Q704,Q705	2212600	DTA124ES
	Diodes	
D701	2239472 or 2243152	RD5.6EB2 or MTZ5.6B
D703-D711	223163	1SS133
	Capacitor	
C701	354721019	100 μF,6.3V,Elect.
	Resistors	
R706-R709	49163472404	4.7k×4,1/10W,Network
R714-R717	49163473404	47k ×4,1/10W,Network
	Opto. module	
U401	241068	BX-1407
	Switches	
S701-S723	25035548	NPS-111-S510
	Socket	
SC701	2000872	NSAS-4P828
	Cushions	
	28140825	t4×50×15mm

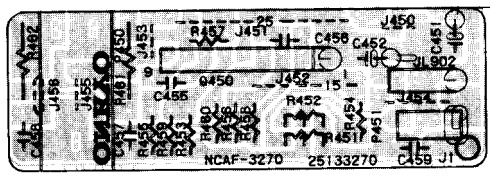
POWER SWITCH PC BOARD(NAPS-3272-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
C951	3500065A	⚠ DE7150FZ103PCSA(400V/125V),Capacitor IS
P951	25035558	⚠ NPS-111-L520P,Power switch
	27300601	⚠ Cover for C951
	25060092	NTM-1S33,Terminals





POWER SWITCH PC BOARD



HEADPHONE AMPLIFIER PC BOARD

HEADPHONE AMPLIFIER PC BOARD(NAAF-3270-1)

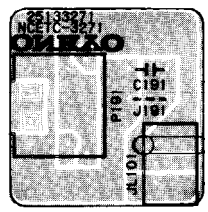
CIRCUIT NO.	PART NO.	DESCRIPTION
Q450	222887	NJM4556S,IC
C451,C452	354744709	47 μF,16V,Elect. capacitors
R451,R452	5104233	N09RGL20KB15F,Variable resistor
R461,R462	442521014	100 Ω,1/2W,Metal oxide film resistors
P450	25045139	HLJ0540-01-010,Stereo headphone terminal
P451	2000865	NSAS-8P-821,Socket

TERMINAL PC BOARD(NAETC-3271-1)

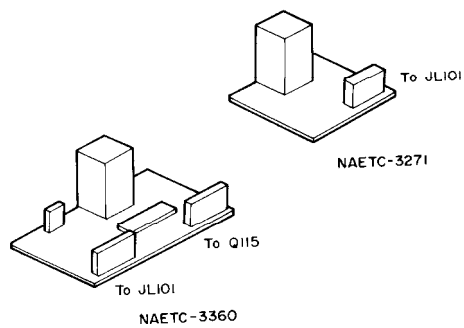
CIRCUIT NO.	PART NO.	DESCRIPTION
P191	25045172	HSJ1003-01-020,Terminal
JL101	25050267	NSCT-3P95,Socket

NOTE: ⟨G⟩ :Only 220/240V Models

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.



TERMINAL PC BOARD



CAUTION

In the Q703 remote control use IC, LC6527H–3722 and LC6527H–3659 are used. In the LC6527H–3722, the LC6527H–3659 and the components attached to the terminal PC board are all built in. Therefore,when the LC–6527H–3659 (Symptom: Remote control does not function)and the parts on the terminal PC board (Symptom:Only the DECK remote control does not function) are exhausted, replace with LC6527H–3722.

BLOCK DIAGRAM